Chapter 7

Key Resources at Risk and Critical Areas

Introduction

Section 319 of the Clean Water Act requires the identification of key resources at risk. Section 6217 of Coastal Zone Act Reauthorization Amendments of 1990 requires the identification of critical areas in the State. In this chapter, the linkage will be made between these two requirements and the Unified Watershed Assessment required in the President's Clean Water Action Plan.

Key resources at risk in Washington are fish habitat, shellfish growing areas, wetlands, and drinking water supplies (quality and quantity). Information is being evaluated that will tell the status of these resources, and of mapping areas that show where impairment or stress is found. These stressed areas will be identified as critical areas. This process is currently under development and will directly feed decision processes involving funding and effort by a broad range of government, tribal and public interests.

At this time, critical areas are defined as impaired watersheds. These have been identified throughout the State using a simple approach. They are the near-term focus for watershed restoration activities described in the Clean Water Action Plan.

Key Resources Threatened
By Nonpoint Source Pollution

Salmon, Steelhead and Trout

Many stocks of wild salmon, steelhead and trout have declined in Washington, the result of many factors. Some are natural and beyond our control, others have resulted directly from human activities. Economic development and rapid population growth have exacerbated conditions unfavorable to salmon production.

Table 7.1
1992 State Salmon and Steelhead Inventory Report

	Healthy	Depressed	Critical	Unknown	Extinct
435 Total Stocks	187	122	12	113	1
Percent of total	43 %	28 %	3 %	26 %	0

At the time of this writing, the National Marine Fisheries Services and US Fish and Wildlife Service have listed a number of Evolutionary Significant Units of fish stocks in Washington under the Endangered Species Act, including cutthroat trout and bull trout, as well as salmonid stocks. These agencies continue to review other stocks for future listings. Current ESA status for Washington State is:

ESA Status	# of Stocks
Endangered	3
Threatened	15
Candidate	10

Table 7.2
Land Use Impacts to Salmon, Steelhead, and Trout

Land Use	Problem
Agriculture, forestry, urban development	High temperature from removal of riparian shade
Agriculture	Bank erosion from animal access
Agriculture and urban development	Low dissolved oxygen due to excess nutrients
Forestry	Coarse sediment from landslides
Agriculture, forestry, recreation, urban development	Fine sediment from road and surface rosion
Forestry, agriculture, urban development	Lack of large organic debris from removal of riparian vegetation
Urban development and water use practices	Reduced flow from over-allocation and impervious surfaces
Diking, stream modification, filling wetlands	Loss of habitat (wetlands, in-stream and ff-stream areas)

Shellfish growing areas

Shellfish production in Washington ranks among the highest in the country. Washington is first in oyster production. Clam beds in Skookum Inlet (south Puget Sound) are the nation's most productive. The shellfish industry in Washington generates 70 million wholesale dollars per year with considerable potential for expansion, particularly for income-poor rural coastal counties. Since 1981, the state Department of Health or local health districts have closed or restricted for harvesting more than 46,000 acres of key shellfish growing areas in Washington due to contamination.

Table 7.3
Land Use Impacts to Shellfish

Land Use	Problem
Logging, agriculture, urban development	Sedimentation in streams, reservoirs and lakes
Agriculture	Fecal coliform and pathogens from animal access in tributaries and lack of proper manure management
Agriculture and gardening	Toxic insecticides
Suburban development	Fecal coliform from failing on-site sewage systems
Shoreline development	Bulkheads and other shoreline construction and habitat alteration

Drinking Water

Nonpoint pollutants eventually run off into surface water or leach into ground water. This hazard is especially important because 70 percent of the state's drinking water comes from groundwater.

Table 7.4
Land Use Impacts on Drinking Water

Land Use	Problem
Agriculture	Elevated nitrates from inappropriate use of animal waste, fertilizers, and pesticides
Agriculture, urban development.	Toxic chemicals from inappropriate use of pesticides
Underground injection wells	30,000+ dry wells and other infiltration devices used to dispose of stormwater
Landfills	Particularly older, unlined dumps leaching and seeping toxics and pathogens
Suburban development	Nutrients and fecal coliform from failing septics

Wetlands

Wetlands and riparian areas provide critical resources to entire ecosystems. Wetlands store water, lessen flooding, and provide rich habitat for a variety of life forms. Riparian areas also provide unique habitat and help keep streams cool.

Historically, wetlands and riparian areas have been altered or destroyed to encourage development across the State. Probably 70 percent of the State's original wetlands have been filled. In the Puget Sound area, only 10 percent of all wetlands remain. Riparian areas also have suffered through destruction of vegetation, streambank erosion, and alterations to stream channels.

Table 7.5
Land Use Impacts to Wetlands

| Land Use	Problem
Upstream pollution, runoff from agriculture and suburban development	Degradation of water quality in wetlands affecting biological community structure
Stormwater discharges and development-induced flooding	Detrimental changes in wetland inundation regimes
Transportation and other linear infrastructure development	Fragmentation of large, intact wetland systems
Shoreline armoring	Interruption of wetland and riparian sediment processes
Introduced species	Detrimental changes in plant and animal communities

Developing a Unified Watershed Assessment - Phase 1

In August of 1998, the Natural Resources Conservation Service (NRCS) and Ecology convened representatives of State and federal agencies and tribes to develop a Unified Watershed Assessment (UWA) for Washington meeting the immediate requirements of the Clean Water Action Plan.   This plan will be the basis for decisions regarding associated funds made by Ecology, NRCS, and the US Forest Service.

The workgroup completed their discussions, and an initial proposal was circulated for public comment prior to submittal to EPA for approval. The time frame to complete the Phase 1 work was very short, and this UWA was based on the best available knowledge. As a condition of agreement, the workgroup planned to further develop it to more closely align with ongoing processes and needs. This effort is currently underway.

Federal guidance also directed the UWA workgroup to develop Restoration Action Strategies for the high priority watersheds. The purpose of these strategies is to assure that UWA funds are effectively targeted. Ecology, NRCS, and US Forest Service are accountable to EPA to show that funds associated with the UWA are targeted to documented issues in the "high priority" watersheds. The restoration activities to be implemented by agencies and local governments will be identified in Chapter 9, Implementation Strategy.

Figure 7.1
Water Resource Inventory Areas (WRIAs)
In Washington
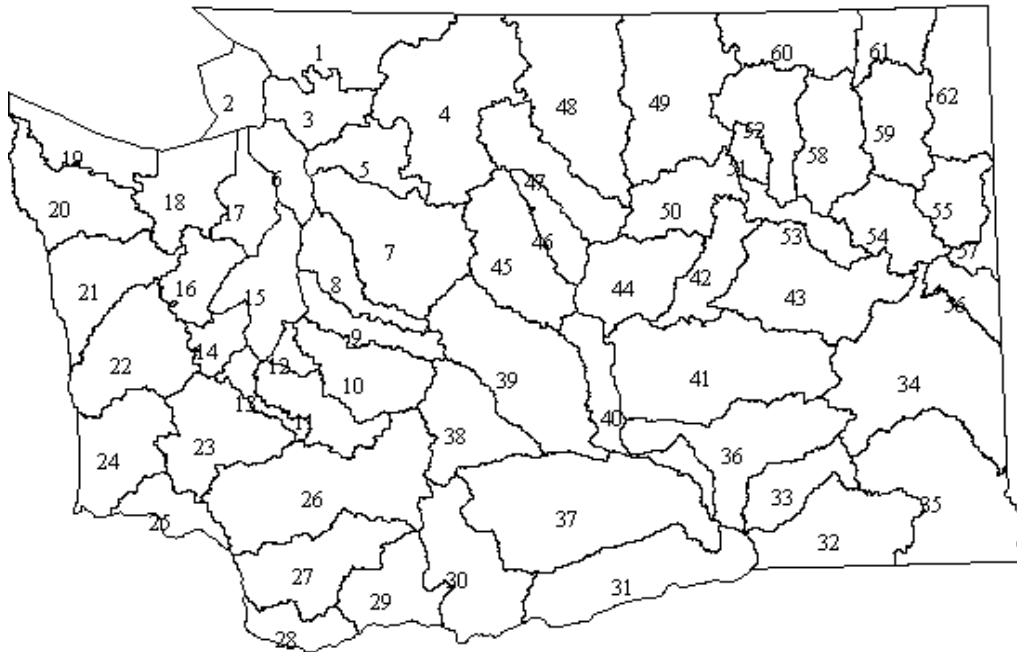
WRIA # and Basin Name

1. Nooksack	17. Quilcene/Snow	33. Lower Snake	49. Okanogan
2. San Juan	18. Elwha/Dungeness	34. Palouse	50. Foster
3. Lower Skagit/Samish	19. Lyre/Hoko	35. Middle Snake	51. Nespelem
4. Upper Skagit	20. Soleduc	36. Esquatzel Coulee	52. Sanpoil
5. Stillaguamish	21. Queets/Quinalt	37. Lower Yakima	53. Lower Lake Roosevelt
6. Island	22. Lower Chehalis	38. Naches	54. Lower Spokane
7. Snohomish	23. Upper Chehalis	39. Upper Yakima	55. Little Spokane
8. Cedar/Sammamish	24. Willapa	40. Alkaki/Squilchuck	56. Hangman
9. Duwamish/Green	25. Grays/Elochoman	41. Lower Crab	57. Middle Spokane
10. Puyallup/White	26. Cowlitz	42. Grand Coulee	58. Middle Lake Roosevelt
11. Nisqually	27. Lewis	43. Upper Crab/Wilson	59. Colville
12. Chambers/Clover	28. Salmon/Washougal	44. Moses Coulee	60. Kettle
13. Deschutes	29. Wind/White Salmon	45. Wenatchee	61. Upper Lake Roosevelt
14. Kennedy Goldsborough	30. Klickitat	46. Entiat	62. Pend Oreille
15. Kitsap	31. Rock Glade	47. Chelan	
16. Skokomish.Dosewallips	32. Walla Walla	48. Methow	

Unified Watershed Assessment - Phase 2

The long-term vision is to have a coordinating tool that

- is flexible to meet agencies/tribes' needs
- allows for consideration of restoration and preservation, and
- provides a common (i.e., "unifying") base for decisions.

This is a vision for a process to come. Since this process is still unfolding in the context of current watershed and salmon efforts, it is difficult to describe with detail how the process will actually work. Ecology staff will work closely with the Joint Natural Resources Cabinet to further refine this concept and carry out the actions needed to make it happen.

A matrix could provide layers of environmental information about Washington's watersheds. The resource managers could use the information layers in a mix-and-match way to help make decisions regarding funding, workload, etc. They could also add "custom" layers specific to their needs.

For instance, the NRCS, in deciding how to target technical assistance, might want to consider how the water quality and fish layers line up with a custom layer on feedlot location. Ecology might want to consider water quality and public health to address a TMDL need.

Although the information in the matrix could be used in different ways, the agencies and participating tribes would be using a common consideration for decisions. Periodic meetings would compare geographic priorities using the information matrix and other agency-specific considerations. Where overlaps occur, opportunities would be sought to coordinate activities.

It would work something like this:
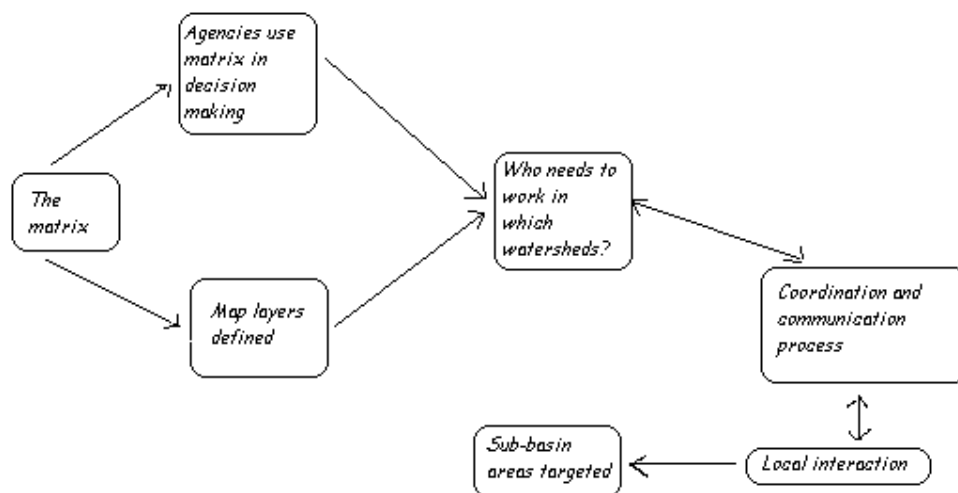
Phase 1 UWA used the WRIA/4th level HUC scale (approximately 62 in the state), and "basin" as used in this document refers to this scale. The information matrix may eventually be constructed at a more refined geographic scale – perhaps using the Washington Administrative Unit (WAU)/5th level HUC (approximately 800 in the State). Prioritizing by agencies would likely still happen at the coarser scale, but opportunities for collaboration, particularly with local efforts and priorities could be considered at the more refined scale.

The process is evolving toward this long-term vision. It will take time to develop the information matrix, and many details need to be worked out. Appropriate information layers, sources of data, etc. must be identified. How it will be maintained, how and how often it will be updated, all need to be determined. It's likely that the information matrix will be developed for a pilot basin or two, and the lessons learned there will be used to further refine the concept before taking it statewide. In the meantime, there will be a tool to use during the next federal and state fiscal years – possibly longer.

Interim Matrix

For the interim, a tool can be used that moves away from a strict sorting and prioritizing of watersheds and towards the future information matrix. This interim tool will begin using the concept of layers of environmental information, but on a simple level, and still at the WRIA/4th level HUC scale.

There are three primary information layers: water, public health, and fish. The three primary layers have sub-layers. In all but one of the sub-layers, WRIAs have been classified as impaired, threatened, or (on layers where it is appropriate and possible) healthy. These terms are descriptive only in a general and relative way. Saying a watershed is "healthy" does not imply that it is free of degradation. One of the sublayers is informational only – no classification is done.

The Water Layer

The water layer has two sub-layers, flow and quality.

Flow

There are various technical problems associated with developing an accurate evaluation of flow in a stream. Many streams and tributaries have little or no data. Combined with the coarseness of the WRIA scale, this makes it difficult to compare flow adequacy. On the other hand, flow is a critical component to consider in the health of a basin.

The information layer for flow is based on a combination of two pieces of information from the January 1999 <u>Draft Statewide Strategy to Recover Salmon – Extinction is Not an Option</u>:

1. Assessment of Adequacy of Water for Fish, Volume 1, map page V.93, and

2. Human Population Growth from 1990 – 2010, Volume II, III - Elements of Recovery, F - Implementation to Insure Success, 3 - Educating the Public about the Needs of Salmon, Attachment 7.

Table 7.6
UWA Flow Impaired Basins

December 1999

Over-appropriated Basins	Flow set/ adequacy not determined	High growth	Medium growth	Low growth
1 – Nooksack		X		
7 – Snohomish		X		
8 – Cedar Sammamish		X		
9 – Duwamish/Green		X		
10 – Puyallup/White		X		
12 – Chambers/Clover		X		
17 – Quilcene/Snow			X	
18 – Elwha/Dungeness			X	
32 – Walla Walla			X	
37 – Lower Yakima		X		
39 – Upper Yakima			X	
45 – Wenatchee			X	

For the UWA, impaired basins are those where the water resources have been over-appropriated and growth is considered high or medium.

Table 7.7
UWA Flow Threatened Basins

December 1999

Over-appropriated Basins	Flow set/ adequacy not determined	High growth	Medium growth	Low growth
	11 – Nisqually		X	
	13 – Deschutes	X		
	14 – Kennedy/ Goldsborough		X	
	15 - Kitsap	X		
35 – Middle Snake				X
38 – Naches				X
48 – Methow				X
49 --Okanogan				X

Threatened basins are those where water resources have been over-appropriated and growth is low, *and* basins where flow levels have been set but the adequacy of those levels has not been determined.

All other watersheds are considered UWA healthy basins. Again, this does not mean these basins are necessarily problem-free. Many flow-related problems have not been identified.

Water Quality

Under the Clean Water Act, Ecology is responsible for producing two periodic reports on water quality in Washington. These reports are named for the sections of the Clean Water Act that require them, the 303(d) List and the 305(b) Report. Because they are developed in different ways, answer different questions and serve different purposes, they create different pictures of water quality in Washington. Ecology uses them to build the water quality information layer for the UWA.

To produce the 305(b) Report, Ecology staff stratify the State according to water body type, size, and eco-region. Then, using ambient monitoring data (i.e., data from sampling designed to give an overall picture rather than targeted at a specific problem), they statistically extrapolate to similar water bodies in similar eco-regions across the State. Water bodies are classified as good, fair or poor in terms of how well they support certain beneficial uses such as swimming, and fish migration and spawning. Section 305(b) defines waters classified as fair or poor as "impaired" waters (notice below that for the purposes of the UWA "impaired" has a different meaning, and is applied to a subset of these 305(b) impaired waters).

For a representative look at the waters of the State, the 305(b) Report is probably the best tool we have. But it also has limitations. A given WRIA may have several eco-regions and a variety of water bodies. Applying an evaluation like "impaired" or "threatened" at a WRIA scale reduces the accuracy of the evaluation, since pristine headwaters can easily be found in the same watershed with degraded lowlands.   Also, because of different aerial divisions for different water body types (i.e., streams are reported in miles, lakes and estuaries are reported in acres), a roll-up of different water body types is problematic.

The 303(d) List, on the other hand, focuses on identifying specific problems in specific water bodies. Each listing represents a violation of water quality standards for one pollutant in one water body segment. So, a given stream segment may be listed once for chlorine, another time for ammonia-N, and another time for fecal coliform. The 303(d) List is based on both ambient monitoring data and project specific data.

Project-specific data tends to be concentrated in areas where there is money for and interest in water quality. The more sampling done in an area, the more problems are likely to be identified, resulting in more 303(d) listings. So, although the 303(d) List is effective for identifying specific problems, it can present a skewed overall picture of the State's waters. On the other hand, the 303(d) List is very important because the Clean Water Act requires that a TMDL (a water cleanup plan) be developed for each listing – a very high priority for State and federal governments. Implementation of TMDLs provides an excellent opportunity for collaboration leading to improved water quality.

For Phase 2 of the UWA, we will use a combination of 305(b) and TMDLs. The 305(b) Report will provide the best representation available of the overall quality of the State's waters, with TMDLs tying back to the 303(d) List and specific water quality problems. These two criteria will be mapped together.

The 305(b) Report

For purposes of the 305(b) Report, streams are evaluated in miles; estuaries and lakes are evaluated in acres. Combining these different evaluations into a roll-up is problematic. For the most accurate picture of all water body types, we would need to provide three separate information layers. In the interest of usability, simplicity, and reasonable consistency with other information layers, we have chosen to look only at streams.

Using the latest 305(b) Report, we determined for each WRIA the percent of streams classified as fair or poor (defined in section 305(b) as "impaired") in terms of how well they support beneficial use. We sorted the WRIAs on that basis, then considered the top third of WRIAs (i.e., those with the highest percentage of poor and fair streams) as UWA impaired. We considered the middle third UWA threatened. The bottom third have at least 48 percent of their streams classified as "good" and are considered UWA healthy (although it should be noted that this term is used in a relative way - having only half a watershed's streams fully supporting beneficial uses is hardly healthy).

Table 7.8

305(b) Status by WRIA

| UWA Impaired		UWA Threatened		UWA Healthy	
WRIA #	**% 305(b) impaired streams**	**WRIA #**	**% 305(b) impaired streams**	**WRIA #**	**% 305(b) impaired streams**
56	90	58	77	8	52
43	90	61	77	21	52
42	90	62	77	16	48
34	90	52	77	5	47
32	90	59	77	39	46
41	90	19	66	18	44
44	90	24	66	30	42
36	90	17	65	9	35
33	89	23	65	27	34
50	89	25	65	1	34
31	88	14	65	11	31
35	88	12	65	7	30
53	88	15	65	26	30
57	83	6	65	46	24
54	83	2	65	38	24
51	81	22	64	10	23
37	79	49	64	47	21
40	79	3	62	48	21
60	79	13	61	45	15
55	78	20	58	29	15
		28	58	4	11

TMDLs

This sub-layer will show TMDLs that are in process, or that have been developed and approved by EPA, but are not yet fully implemented. WRIAs with ongoing TMDLs are noted on the Water Quality map at the end of this section by a *. (Please note that the list as presented below is currently *(October, 1999)* being reviewed by Ecology's regional offices and others, and may change in the final document.)

Since each TMDLs represents a known water quality impairment, for this layer only we will not use the impaired, threatened, and healthy classifications. Instead, for each watershed in which there are TMDLs in process or yet to be fully implemented, we have listed the water bodies involved.

Table 7.9
Water Bodies with TMDLs in Process

WRIA #	Water Bodies With TMDLs In Process or Not Yet Fully Implemented
1	Fishtrap Creek, Nooksack River, Johnson Creek
3	Lower Skagit River
5	Stillaguamish River (Portage Creek)
7	Snoqualmie River, Snohomish River (Steamboat Slough, Ebey Slough, Allen Creek, Quilceda Creek, Wood Creek marsh lands, Pilchuck River, French Creek), Woods Creek
8	Pipers Creek, North Creek, Beaver Lake, Issaquah Creek system, Tibbets Creek, Laughing Jacob's Creek, Pine Lake Creek, Eton Creek, May Creek, Larsen Lake
9	Green/Duwamish, Elliot Bay
10	Upper White River (Stuck River, Scatter Creek, Clearwater River, Greenwater River)
12	Steilacoom Lake, S. Puget Sound
15	Port Gamble Bay, Liberty Bay, Sinclair Inlet, Gorst Creek, Union River
16	Skokomish River (Weaver Creek, Hunter Creek, Purdy Creek), 10 Acre Creek
18	Matriotti Creek, Dungeness Bay
22	Grays Harbor, Duck Lake, Humptulips River, Rabbit Creek
23	Chehalis River (Black River, Lincoln Creek, Scatter Creek, Dillenbaugh Creek, Skookumchuck Creek, Salzer Creek, Newaukum River), Rabbit Creek
24	Palix River, Willapa River
25	Longview Ditches
29	Wind River
30	Little Klickitat
33	Snake River
34	Snake River
35	Snake River
37	Yakima River, Griffen Lake
38	Upper Yakima
39	Teanaway River (Stafford Creek)
41	Moses Lake
47	Railroad Creek, Lake Chelan
54	Spokane River
55	Spokane River
+56	Spokane River, Hangman Creek
57	Spokane River

Figure 7.2
305(B) Streams and WRIAs with Ongoing TMDLs
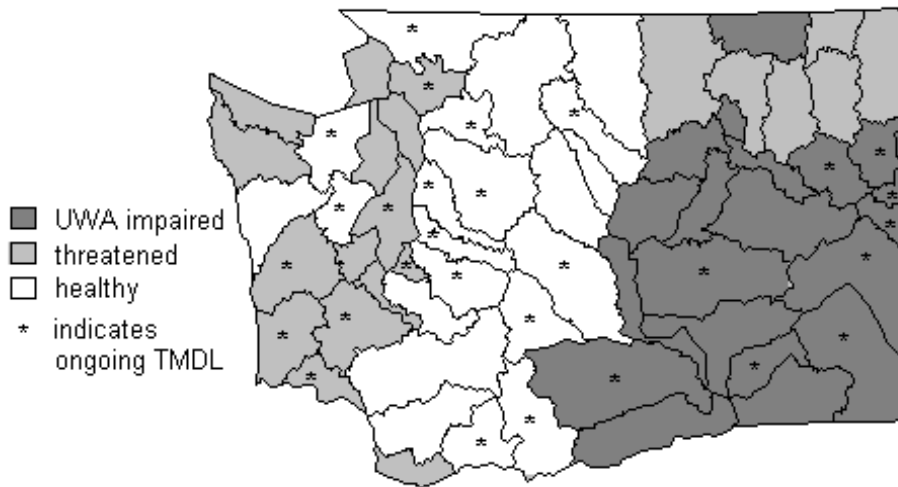
This information layer is a very coarse tool for consideration in water quality decisions. While we believe that using the 305(b) Report provides the best available overall evaluation of the State's water quality, it is far from perfect. The more diverse the geology of a WRIA, the less representative the rating will be. That is compounded by the UWA rating of impaired, threatened or healthy. Those terms are only applicable in so far are they rank the WRIAs relative to each other (sort of like grading on the curve). WRIAs classified as healthy can have serious water quality problems and those classified as impaired may have large pristine areas. Users of the water quality matrix will get the best understanding by considering the overall representation presented by 305(b) together with the existence and number of TMDLs. If the workgroup decides to go to finer scale watersheds, a better evaluation will be possible.

The Public Health Layer

The Public Health layer of the UWA has three components: shellfish concerns, nitrates in drinking water, and basins where surface water is used as a source of drinking water. These three components are described in detail below.

Shellfish

The Department of Health Office of Shellfish Programs conducts sanitary surveys (an evaluation of the concentrations, sources, and environmental influences on pollution) of commercial shellfish growing areas in Washington. The information is used to classify growing areas into four categories:

1. **Approved** – This classification authorizes the growing or harvesting of shellfish for direct marketing. A growing area may be classified as Approved when pollution

source evaluations and the bacteriological water quality data show that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in dangerous concentrations.

2. **Conditionally approved** – A growing area that meets Approved criteria except for a predictable period may be classified as Conditionally Approved. The period is based on established performance standards specified in a management plan. For example, a predictable pollution event, such as a predetermined amount of rainfall in 24 hours, results in the temporary closure of the Conditionally Approved growing area.

3. **Restricted** – If the bacteriological water quality of a commercial growing area does not meet the standard for an Approved classification, but the sanitary survey indicates only a limited degree of pollution, the area may be classified as Restricted. Shellfish harvested from Restricted growing areas cannot be marketed directly, but must be relayed to an Approved growing area for natural biological cleansing. Restricted classifications are only considered where levels of fecal pollution or poisonous or deleterious substances are low enough that relaying will purify the shellfish prior to marketing.

4. **Prohibited** – A growing area may be classified as Prohibited when information indicates that fecal material, pathogenic microorganisms, marine biotoxins, and poisonous or deleterious substances may be present in dangerous concentrations. Marine waters adjacent to sewage treatment plant outfalls and other persistent or unpredictable pollution sources are classified as Prohibited. Commercial harvests of shellfish are not allowed from Prohibited areas.

The Department of Health also conducts water quality studies throughout the year in all active commercial shellfish growing areas. When water quality in a growing area is found to be deteriorating, the area is considered "threatened", indicating that it is at risk of moving into a lower classification. The list of Threatened growing areas is updated yearly. The UWA Threatened Basins are those with growing areas that the Department of Health currently considers to be threatened.

The UWA Impaired Basins have growing areas the Department of Health has downgraded, i.e., where harvest restrictions are in place due to impaired water quality. This includes any basin containing a growing area in a classification other than Approved.

There are several ways a basin can appear as both threatened and impaired. A growing area may have been downgraded <u>and</u> be threatened with further downgrade. A bay may also contain several different growing areas, with the different areas having different status.

This information layer, of course, applies only to certain WRIAs on the west side of the state. We have not included areas that are always closed due to the proximity of a sewer

outfall. Neither have we included recreational harvest areas.   For these reasons, we have not identified "healthy" WRIAs for this information layer.

Table 7.10
Shellfish Status by WRIA

WRIA #	UWA Threatened	UWA Impaired
1	Drayton Harbor	Drayton Harbor
1	Portage Bay	Portage Bay
1	Samish Bay	
3	Samish Bay	S. Skagit Bay
3		N. Skagit Bay
5		Port Susan
11	Nisqually	Nisqually Reach
13	Henderson Inlet	S. Henderson Inlet
13		S. Eld Inlet
14	North Bay	North Bay
14	Lynch Cove S. Shore	S. Eld Inlet
14		Lower Hood Canal
15	Lemolo (Liberty Bay)	North Bay
15	North Bay	Burley Lagoon
15	Tahuya	Minter Bay
15	Dutcher Cove (Case Inlet)	Liberty Bay
15	Filuchy Bay	Port Gamble
15	Henderson Bay	Lower Hood Canal
15		Rocky Bay
16		Dosewallips Delta
16		Duckabush Delta
16		Lilliwaup
17		Quilcene Bay
18	Dungeness Bay	
24	Bay Center	Bay Center
24	Naselle	

Surface Drinking Water Sources

This sub-layer identifies basins that contain sources for larger public drinking water systems where surface water represents a significant portion of the system's total capacity. The vulnerability of surface water to contamination and the potential impact on human health make these basins important areas for protection and preservation. Therefore, basins in this information sub-layer are all considered Healthy for the purposes of this document. This category was selected because of the desire to emphasize the importance of protecting and preserving watersheds that are significantly relied upon for drinking water.

Data for this layer was compiled from the Department of Health's Drinking Water Database

(downloaded on July 28, 1999).   The data set that was used included all Group A water systems, as defined by the federal Safe Drinking Water Act, reporting total connections equal to or greater than one thousand connections.   This data set was further screened for systems using surface water sources as permanent or seasonal supplies that represent at least 25 percent of the system's permanent and seasonal capacity. Drinking water sources are categorized as permanent, seasonal, or emergency.

1 – Whatcom	10 – Puyallup/White	26 – Lewis
2 – San Juan	11 - Nisqually	29 – Wind/White Salmon
3 – Lower Skagit	15 – Kitsap	31 - Rock/Glade
7 – Snohomish	17 – Quilcene/Snow	32 – Walla Walla
8 - Cedar/Sammamish	22 – Lower Chehalis	36 - Esquazel/Coulee
9 - Duwamish/Green	23 – Upper Chehalis	37 - Lower Yakima
	24 – Willapa	47 – Chelan

Nitrates in Drinking Water

This sub-layer identifies basins with concerns related to nitrates in drinking water. It includes basins where five percent or more of the approved drinking water sources have submitted sample results to the Department of Health indicating nitrate concentrations greater than or equal to five milligrams per liter. This concentration was selected because it is the trigger above which a public water system must conduct quarterly samplings due to concerns about potential health effects. The threshold of five percent was selected to ensure that the screen captured all areas where nitrate concentrations indicate a potentially significant impairment. Note that nitrate contamination is primarily a concern related to shallow aquifers. These relatively shallow aquifers are used more predominately by smaller water systems. The data set used included sources from larger water systems that are likely to have multiple wells using deeper aquifers. It is expected that the percent of sources indicating nitrate contamination will be very small. Therefore, a relatively low threshold was selected. All basins on this sub-layer are considered impaired.

Data for this layer was compiled from the State Department of Health's Drinking Water Database. All public water supplies regulated by Health are required to sample their source for nitrates at least once every 36 months. For this reason data were analyzed for the period from June 1996 through June 1999. The data set that was used included all Group A and Group B water systems, as defined by the federal Safe Drinking Water Act.

1 – Nooksack	36 – Esquazel Coulee	50 - Foster
31 - Rock/Glade	37 – Lower Yakima	53 – Lower Lake Roosevelt
32 - Walla Walla	41 – Lower Crab	54 – Lower Spokane
33 – Lower Snake	42 – Grand Coulee	55 – Little Spokane
34 - Palouse	43 - Upper Crab/Wilson	56 - Hangman
	44 – Moses Coulee	58 – Middle Lake Roosevelt

The Fish Layer

The fish layer is based on the January 1999 <u>Draft Statewide Strategy to Recover Salmon – Extinction is Not an Option</u>.

A model is presented in that draft that uses the Salmon and Steelhead Stock Inventory (SASSI) and Endangered Species Act (ESA) listing data as a screening tool to develop a ranking of all 62 WRIAs on the basis of their healthy and unhealthy salmonid stocks. Point values and totals were calculated based on critical, depressed, healthy, or unknown stock status for salmonids in each WRIA and on the presence of salmonid species listed or proposed for listing as threatened or endangered under ESA. Evaluated stocks include chinook, chum, coho, pink, sockeye, steelhead, bull trout, and cutthroat trout/dolly varden.

UWA threatened basins are those that rank high in both healthy and unhealthy stocks ("high" is defined as least healthy 25). UWA impaired basins are those that rank high in unhealthy stocks (i.e., top 25), and low in healthy stocks (i.e., #26 and below).

Table 7.11
Fish Status by WRIA

Impaired Basins
High unhealthy stocks/low healthy stocks

WRIA #	Rank unhealthy	Rank healthy
26	3	26
35	9	35
28	12	30
29	16	28
38	18	40
46	22	36
39	23	44
30	24	29

Threatened Basins
High unhealthy stocks/high healthy stocks

WRIA #	Rank unhealthy	Rank healthy
25	1	22
18	2	18
48	4	25
45	5	16
27	6	20
3	7	7
17	8	21
16	10	6
1	11	17
15	13	4
21	14	2
20	15	1
8	17	23
5	19	12
7	20	5
37	21	24
11	25	10

Of course, there are many opportunities for both restoration and preservation work for fish other than salmonids. However, because the UWA is aimed at increasing cooperation in watershed activities and resources, and because most of the fish-centered activities and resources in Washington in 1999 are focused on salmonids, we have based this layer on the work of the Governor's Salmon Recovery Office. The workgroup may consider expanding the fish layer in the future to address other issues.

Watershed Restoration Action Strategies

The next second step in the UWA federal guidance directs states to develop Watershed Restoration Action Strategies (WRASs) for the high priority watersheds. The purpose of these strategies is to assure that UWA funds are effectively targeted. Ecology, NRCS, and US Forest Service are accountable to EPA to show that funds associated with the UWA are targeted to documented issues in the "high priority" watersheds.

The Watershed Restoration Action Strategy Approach for Washington

The information matrix can provide a foundation for collaboration among the resource managers when used to make decisions about directing watershed resources. Although we may use it in a variety of different ways to help us establish priorities, it gives us a common starting point. At a coarse level, it can help us see where work may need to be done, identify geographic areas of common interest, and identify opportunities to coordinate our activities with each other and with local interests and efforts. As we work with the information matrix, we can continue in the future to develop and refine it to better suit our needs.

Coordination is a key aspect of Washington's UWA. In 1999, at least $143 million was spent on watershed efforts, salmon restoration, and nonpoint source control. Identifying critical areas and their lead agencies through the UWA would greatly increase coordination and effectiveness. An interagency agreement may provide the basis for coordination. The Governor's Joint Natural Resource Cabinet is expected to support the approach and help with coordination.

However, for watershed management and restoration to be successfully implemented, a local government must provide certainty through a regulatory implementation strategy including the development of land use designations through zoning, critical area protection, and capital facilities infrastructure funding.

Three elements interrelate to create a phased approach to restoration action strategies for Washington's watersheds:

1. Local watershed efforts already in place
2. The update of Washington's Nonpoint Source Management Plan
3. Local efforts being coordinated and funded under Washington's Watershed Management Act and Salmon Recovery Act

The Elements

1) A lot of watershed assessment, planning, and implementation has been done in Washington at the local level. These efforts are often tied to regulatory responsibilities, technical assistance, and/or funding sources administered by State and federal agencies. This local work is the foundation of the restoration action strategies. The matrix on the next page lists principle restoration plans already in place for sample watersheds.

   This first element/phase of Washington's Watershed Restoration Action Strategy was submitted to EPA in draft form in May 1999.

2) The Nonpoint Source Management Plan for Washington will provide the second element of our WRASs – the statewide, programmatic view. Appendix 1 of the plan characterizes each watershed using land use, demographics, 303d and TMDLs completed, principal causes and sources of problems, critical areas, and existing water quality programs in place. Projects funded by incremental funds must address problems identified in this characterization and included in the completed management plan. In addition, the Plan will discuss how the agencies are working together on long-term development of our Unified Watershed Assessment, the related opportunities for coordinating programmatic activities, and the responsibility each has as an implementation partner.

3) The third element of WRASs in Washington is more long term and encompassing. It is based on current major watershed efforts through the Watershed Management Act (WMA) and Salmon Recovery Act (SMA). See full description of these acts in Chapter 3. Together these two processes _are_ long-term watershed planning in Washington. Both rely on local governments assuming responsibility for planning and action. Both bring together various levels of government, Tribes, conservation or special districts, nonprofit groups, citizens, and other interests. Both are funded through the State legislature. These are big efforts. They involve a major commitment from State agencies, local and tribal governments, the State legislature, and other groups.

   Watershed recovery efforts through either a WMA planning unit or SRA committee or both are underway in all but four of the WRIAs considered as high priority in this document.   As the accompanying matrix demonstrates, all the high priority WRIAs have other major recovery efforts underway. In addition, the Governor's Salmon Team is pursuing a statewide salmon recovery strategy that will address many of the relevant issues.

The following information demonstrates the level of restoration planning completed or underway in selected WRIAs across the state.

Table 7.12
Existing Restoration Plans in Selected WRIAs in Washington

Example WRIAs	WMA 2514	SRA 2496	P.S. Watershed Action Plan	Approved TMDL**	Watershed Analysis	WQ Plan of Action	Lake Restoration Plan
#1 Nooksack	X	X	Kamm Creek Silver Creek Drayton Harbor Sammish Bay Tenmile Creek	Sumas River	Acme Lake Watcom Hutchison Ck Porter Canyon Skookum Ck Warnick		Whatcom Lake
#3 Lower Skagit/ Samish	X	X	Nookachamps Sammish Bay Sammish River Padilla Bay/ Bay View Lower Skagit	Erie Lake Campbell Lake	Hansen Ck	Skagit/ Stillaguamish Watershed	Big Lake Ketchum Lake Erie Lake
#5 Stillaguamish			Stillaguamish		Deer Ck Hazel	Skagit/ Stillaguamish Watershed	Ki Lake Lake Martha
#7 Snohomish			North Creek French Creek Quilceda/Allen	Snohomish River Snoqualmie River (x3)	Tolt River Woods Ck Griffin Ck Tokul Ck	Island/ Snohomish Watershed	Blackmans Lake Crabapple Lake Goodwin Lake Howard Lake Loma Lake Martha Lake Roesiger Lake Shoecraft Lake Stevens Lake Sawyer Lake
#10 Puyallup/ White		X	Lower Puyallup Chambers/ Clover Burley /Minter Upper Puyallup	Commence- ment Bay Puyallup River (x2) Boise Creek	Clearwater/ Mid. White	South Puget Sound Watershed	Snake Lake
#16 Skokomish/ Dosewallips	X	X			-Skokomish, S.F.		
#17 Quilcene/ Snow	X	X	Port Ludlow Discovery Bay Sequim Bay Quilcene/ Dabob		Big Quilcene		
#18 Elwah/ Dungeness	X	X	Dungeness River Area Port Angeles Urban Wshed	Strait of Juan de Fuca			
#22 Lower Chehalis	X		Chehalis River Basis Action Plan for the Identification	Grays Harbor Wildcat Creek	Wynoochee		Duck Lake

			and Control of Non Point Pollution				
#29 Wind/ White Salmon		X	White Salmon		Panakanic		
#32 Walla Walla		X		Mill Creek	Wolf F./ Robinette		
#37 Lower Yakima	X		Yakima River	Yakima River (x2)	Darland Foundation		Griffin Lake
#41 Lower Crab			Weber Coulee MidColumbia Watershed Planning	BOR Wasteways			Moses Lake
#47 Chelan			Lake Chelan	Lake Chelan			

Additional Restoration Plans -- same Selected SampleWRIAs

Example WRIAs	PL 566 Projects	EQIP GPAs	Shellfish Closure Response Plan	Coordinated Water System Plans	Groundwater Management Areas	Other Plans
#1 Nooksack	Tenmile Ck	North Puget Sound	Portage Bay Drayton Harbor	Whatcom County		S.Fork Sediment Reduction Plan N.Fork Sediment Reduction Plan Middle Fork Sediment Reduction Plan
#3 Lower Skagit/ Samish		North Puget Sound	Samish Bay	Skagit County		Skagit Cnty Watershed Ranking
#5 Stillaguamish		North Puget Sound		North Snohomish County	West Snohomish	Watershed Assessment and Salmonid Habitat Restoration Strategy for Deer Creek
#7 Snohomish		North Puget Sound		North Snohomish County East King County	West Snohomish Redmond/Bear Creek E. King County Issaquah Ck Valley S. King County	Animal Waste Management Plan for the Snohomish River
#10 Puyallup/ White				Pierce County		White River Culvert Assessment Project
#16		North	Lilliwaup Bay			Mason County

Skokomish/ Dosewallips		Puget Sound			Watershed Ranking Project
#17 Quilcene/ Snow		North Puget Sound		Jefferson County	Clallam Landscape Management Plan
#18 Elwah/ Dungeness		North Puget Sound			Clallam Landscape Management Plan Dungeness/ Quilcene Water Resources Mngt Plan
#22 Lower Chehalis					Chehalis River Basin Fisheries Resources: Status, Trends and Restoration Goals
#29 Wind/ White Salmon					
#32 Walla Walla		Blue Mountain			Walla Walla Watershed Restoration Project
#37 Lower Yakima	Moxee Creek	Lower Yakima River			Spring Creek Watershed Project
#41 Lower Crab		Lind Coulee Columbia Basin		Grant County (Quincy Sub-basin)	Columbia Basin
#47 Chelan		Chelan			

** In addition to the completed TMDLs listed, 24 TMDLs are under development in the high priority WRIAs listed on the matrix.

Implementation of Watershed Restoration Action Plans

Washington will rely on the commitment of agencies and the three elements mentioned above, to coordinate the development of watershed restoration action strategies. The information matrix established in the UWA will first show where the primary water related concerns are in the State. This tool continues to be refined, but is very usable in its current configuration.

Agencies will be asked to use this information to identify areas of the State where they intend to target resources in the coming years. An example might be shellfish restoration. We have identified WRIAs (or parts of WRIAs) that Health intends to focus on, due to threats of downgrades or implementation of restoration activities. This will not be as clear for other agencies. The intent is to work in this fashion to determine agency priorities based on a common base of information made available to all.

Once agencies have identified their priority areas, a process will be designed to promote coordination, first between agencies, and then with local interests. Where common interests have been identified, agencies will commit to approach local interests to determine specific needs and identify common concerns that can be addressed in a comprehensive manner. This evaluation will result in a plan of action for the area, which constitutes the Watershed Restoration Action Strategy.

In many cases, local efforts at broad scale planning are already underway. These planning and implementation groups will provide the forum for coordination with agencies. Local efforts will rely heavily on existing studies, at least to start. In the future, more broad-spectrum evaluations of WRIAs will provide a clearer understanding of watershed processes and indicate where restoration and prevention resources need to be targeted.